Damien **LaRocque**

M.Sc. Computer Science (Robotics) · B.Eng. Electrical Engineering · Belgo-Canadian 🇨🇦 🇧🇪

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Education

Université Laval
Quebec City, QC, Canada

Master Degree of Computer Science
2020-2024

Cumulative GPA: *4.26/4.33*

Thesis title: "*Terrain Analysis using Data from Proprioceptive Sensors on Mobile Robots*"

- Research on terrain characterization and Uncrewed Ground Vehicle (UGV) power consumption
- Field deployments with UGVs in a boreal forest
- Robot Operating System (ROS) and ROS 2 integration, configuration and troubleshooting on mobile robots

Université de Moncton
Moncton, NB, Canada

Bachelor Degree of Electrical Engineering
2015-2020

Cumulative GPA: *4.22/4.30*

Work Experience

Université Laval
Quebec City, QC, Canada

Research Intern in Robotics
Summer 2019

Development of a MATLAB interface for simulation of serial manipulators in inverse kinematics problems. This interface is used to teach inverse kinematics algorithms to mechanical engineering students at Université Laval.

Université de Moncton
Moncton, NB, Canada

Research Assistant in Deep Learning
2017-2018

Object Detection by applying Deep Learning solutions to embedded systems, for industrial applications.
- Use of TensorFlow and Keras
- Documentation writing

Emera & NB Power Research Centre for Smart Grid Technologies
Fredericton, NB, Canada

Research Intern
Summer 2017

Powerflow analysis & modelling using CYME.

Université de Moncton
Moncton, NB, Canada

Research Assistant
2016-2017

- Development of a communication interface between a smart air exchanger and a database.
- Signal measurements from a ESP8266 WiFi transmitter for IoT applications.

Skills

Programming

Languages	Python (Expert), C++, LaTeX, JavaScript (Bases), Rust (Bases)
Libraries/Frameworks	ROS, ROS 2, OpenCV, Flask, Python scientific programming, Python packaging
DevOps	Git (Advanced), Docker, Podman, GitLab CI, `pyenv`, `tmux`, `vcstool`, Linux User (Ubuntu, Debian)
Editors	`(neo)vim`, VSCode, Experienced with JetBrains IDEs
Embedded Programming	Raspberry Pi, PlatformIO, ESP, Arduino

Others

Electronic CAD	KiCad, LTSpice, NI Multisim
Mechanical CAD	FreeCAD, Ondsel ES
Vector graphics	Inkscape, LaTeX with TikZ
Languages	French (Mother tongue), English (Bilingual), German (Conversational), Dutch (Conversational)

Publications

[1] **D. LaRocque**, W. Guimont-Martin, D.-A. Duclos, P. Giguère, and F. Pomerleau, "Proprioception Is All You Need: Terrain Classification for Boreal Forests", *arXiv preprint arXiv:2403.16877, accepted to the 2024 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2024.

[2] M. Vaidis, W. Dubois, E. Daum, **D. LaRocque**, and F. Pomerleau, "Uncertainty analysis for accurate ground truth trajectories with robotic total stations", in *2023 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, IEEE, Oct. 2023.

[3] D. Baril, S.-P. Deschênes, O. Gamache, *et al.*, "Kilometer-scale autonomous navigation in subarctic forests: Challenges and lessons learned", *Field Robotics*, vol. 2, no. 1, pp. 1628–1660, Mar. 2022.

Projects

STUDENT CLUBS

Team Chat Robotique   *Le Creusot, France*

Team participating in the French Robotics Cup   *2021-*

Team Chat Robotique is a team participating in the French Robotics Cup, the largest student robotics competition in Europe. The team's robots are autonomous and are designed to perform agility tasks in a given time. The robots are designed remotely, since all the members are spread across France and the world.

- **Electronic lead**: Robot electrical architecture design, PCB design with KiCad, Soldering
- **Programming**: Robot interfacing and drivers, Computer Vision: Pose estimation with ArUco markers, Website maintenance

Groupe de Robotique de l'Université de Moncton (GRUM)   *Moncton, NB, Canada*

Team participating in the Eurobot robotics competition   *2017-2020*

GRUM is a team participating in the *Eurobot* competition, the European final of the French Robotics Cup, with up to 300 participating teams coming from up to 40 countries around the world. The team's robots are autonomous and are designed to perform agility tasks in a given time.

- **Computer Vision**: Image processing to detect objects in images acquired by our robots
- **Project management**: Organization of meetings and programming classes for the members of the club, Search for sponsors
- **Awards**: *Eurobot* 2019 Team Spirit Award, 2019 Student Delegation of the Year Award of Université de Moncton.

OPEN SOURCE PROJECTS

rosbag-tools

A ROS-agnostic toolbox for common rosbag operations   *2023-*

- Developer and maintainer of a Python package to rapidly process *ROSBag* datasets.
- *ROSBag* is the standard file format to record robot data in ROS.

tcr-roboclaw

An easy to install version of Basicmicro's RoboClaw Python library   *2022-*

Developer and maintainer of `tcr-roboclaw`, a Python package to control BasicMicro's *RoboClaw* motor drivers.

Certifications

Jan 2020 **IELTS Academic 8.0,** IELTS

Jun 2019 **WHMIS 2015,** Université Laval

Grants & Awards

GRANTS

2021-2022 **FRQNT scholarship for Francophone Canadians**
Fonds de recherche du Québec - Nature et technologies

2020-2021 **Canada Graduate Scholarship - Master**
Natural Sciences and Engineering Research Council

2017 **Undergraduate Student Research Award**
Natural Sciences and Engineering Research Council

2015 **21,000$ of scholarships**
Université de Moncton

ACADEMIC AWARDS

2020 **Best academic performance of the class**   *Moncton, NB,*
Université de Moncton Engineering Faculty   *Canada*

2018 **Duc T. Phi Award for academic excellence in Electrical Engineering degree courses**   *Moncton, NB,*
Université de Moncton Engineering Faculty   *Canada*